Paper 26-25

Implementing Public Sector Performance Management

A Balanced Scorecard Approach

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EXECUTIVE SUMMARY

Paralysis by analysis is very common in executive management today. Many organizations are experiencing death by details. They are measuring and tracking the right information, but have no effective way to gather, organize and easily view data and report on information that would help the corner office thinkers make decisions.

The balanced scorecard approach focuses on KPIs (key performance indicators). KPI's are your organization's radar to the road ahead, acting as leading indicators to maneuver away from using last month's actuals as your forecast tool. Using past performance data (lagging indicators) to make decisions is like driving while looking in the rear view mirror. An effective balanced scorecard should have a mix of both outcome measures and performance drivers. Outcome measures without performance drivers do not communicate how the outcomes are to be achieved. Conversely, performance drivers without outcome measures may result in local improvements for the business unit, but are not likely to result in expanded or enhanced financial performance for the organization as a whole.

This paper will examine a methodology to improve the process of linking performance measures and costs directly to programs through a balanced scorecard framework. It will also demonstrate how the combination of a data warehousing methodology can be coupled with the role of our SAS® System to build a clear integrated performance system.

MANDATES ON PERFORMANCE

Public sector managers have been flooded by a sea of mandates over the last ten years designed to monitor accountability for a department or agency to meet specific goals. This legislation was created to effect organizational towards greater efficiency. The most notable, is the Government Performance and Results Act of 1993 (GPRA) which created a standard planning and performance reporting process in federal agencies. GPRA requires each department to create a strategic plan, a performance plan, and a performance report. This act requires all agencies to write the strategic plan by September 30, 1997, the annual performance plan for fiscal year 1999, and a performance report by March 31, 2000.

GPRA is the primary legislative framework through which federal agencies will be required to establish accountability for improving strategic planning, budgeting, and the evaluation of programs.

GMRA (Government Management Performance Act of 1994) provides a more effective and responsive government through a series of management reforms primarily for Federal human resources and financial management. The act, for FY 1996 and each year after, that all major Federal departments and agencies prepare a financial statement covering all accounts and associated activities of each office and bureau. The statement should conform to OMB guidance, and it should be audited by the agency Inspector General. The statement should reflect (A) the overall financial position of the offices, bureaus, and activities covered by the statement, including assets and liabilities thereof; and (B) results of operations of those offices, bureaus, and activities.

GMRA requires a government-wide financial statement, for FY 1997 and each year after, prepared by the Secretary of the Treasury in coordination with the Director of OMB, audited by the US Comptroller General reflects the overall financial position of the US government, including assets and liabilities and results of operations.

Other mandates include the Clinger-Cohen Act, which relates IT to departmental mission and performance; the CFO Act, which establishes the need for performance measures; The National performance Review, directed at improving customer service; and the Information Management Technology Reform Act to establish performance-measurement analysis.

Public sector managers will fight for greater accountability and struggling on how to measure more accurately the outcomes of their activities, not just the outputs.

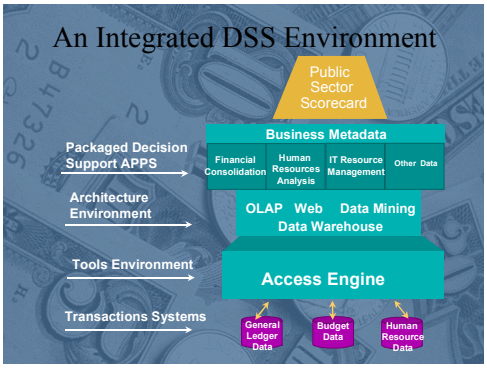
There are essentially four components that a total performance management system requires to create a good solid performance report:

1. A statement of appropriate objectives that are truly measurable (and the available data to make these measurements), and an overall strategic plan
2. Programs to achieve these objectives as well as the means of linking measurements and objectives
3. Solid costing programs and the accounting means and methods for getting good cost information
4. The ability to tie the three prior elements into the budgeting system

Forward thinking and aggressive managers are in search of more than just compliance with mandates. Instead of just handing in a performance report, they would rather proactively manage the operations and services of their business on an on-going basis. One of the major challenges associated with this reengineering effort is data capacity and management. Managers are concerned about the ability of their systems to deliver data needed to report performance and results measurements. Other concerns include the inability to deliver the data quick enough to produce ad-hoc reports and short term solutions that solve immediate compliance mandates, but fail to deliver what the managers need most: a strategic management infrastructure that can grow and be flexible as departmental requirements change.

INTEGRATED DECISION SUPPORT ENVIRONMENT

An integrated decision support system has the ability to access, manage, organize and exploit your data from multiple sources and different systems. Your Scorecard sits on top of your applications and assembles information from many different areas and systems within your organization. All components of your balanced scorecard must be able to communicate, share data, read the same files and export information with other components. Failure to communicate and share data will result in a system laden with manual processes, inaccurate data and glorified spreadsheets.

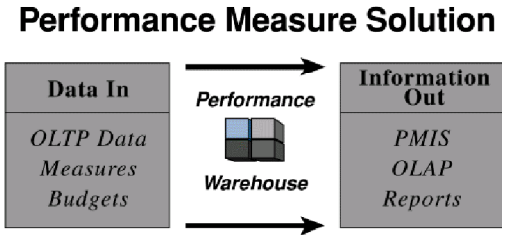


The first stage of communication is access to all you transactional data. The ability to access transactional systems, to load data and to drill back in to that detailed information, is essential for good reporting. An access tool that is flexible and can get to data on any hardware platform or in any just about any format will not limit your scorecard and allow easier updates.

After a flexible access tool, an environment of managing and exploiting the data is needed. A data warehouse is the heart and soul of your balance scorecard.

DATA WAREHOUSING METHODOLOGY

Thus, the methodology is a Performance Management solution wrapped around data warehousing technology. The data (budget, costs, and measures) comes from multiple data sources, multiple platforms, and stovepipe systems at different times. The way to address this complexity is data warehousing. By utilizing a central repository of information, managers have the ability to look at their data in a timely and accurate manner and make proactive rather than reactive decisions.



The major steps in creating a performance warehouse are:

1. Data modeling
2. Data extraction
3. Data transformations
4. Loading the warehouse
5. Creation of business and technical metadata
6. Exploitation of the data

DATA MODELING

The first step to create a performance warehouse is data modeling. By looking at the Strategic Plan and Performance Plan, figure out the subject definitions to model against plus the user requirements needed to view the data. Examples of subject definitions could be finance, human resources, customer feedback, measures, programs, or budgets. This is the place where the designer needs to associate the costs, programs and measures in a logical representation to figure out the structure and the content.

Logical modeling results in the performance data model. Different techniques can be applied here including entity-relationship, star schema, and snowflake schema, or multidimensional stores. The latter three are recommended for this approach since users will need dimensionality to look at a program sliced by a certain cost, associated with a measure compared against a goal. To help with the data modeling, the ERwin™ modeling tool is integrated in with the SAS/Warehouse Administrator™. Here, once the model is created, it can be populated into the metadata.

Physical data modeling is the process of mapping the logical data model to the warehouse repository structure. Physical modeling is where the data will come from, how often to refresh, and different types of storage.

DATA ACCESS

Since data capacity is a significant issue, accessing the data is a major step in the process. Data required for this system is never available in one place, but in scores of disparate stovepipe systems. For example, cost data needs to be extracted from an activity based accounting system, budget data out of the financial system, and measures out of various systems such as surveys being done via the web. Each one of these systems probably resides on multiple platforms.

To help with this complexity, the enabling technology behind the SAS data access strategy is the Multiple Engine Architecture (MEA) and Multi Vendor Architecture (MVA). MEA provides more than 50 different access methods for a variety of file types found in hardware environments. These methods include:

- Relational database management systems (Oracle, Sybase, Informix)
- Hierarchical database management systems
- Network database management systems
- ODBC connectivity
- External file formats, such as VSAM
- Sequential files such as tapes
- SAS tables

The engines translate SAS software read and write request for data into the appropriate calls for each database management system and file structure. Engines surface data into the SAS System in two forms, logical views to the native data source or extracts of native data into SAS data tables. The SAS fourth generation language (4GL) is the deployment of these extracts. To assist in the extraction, the SAS/Warehouse Administrator creates in a point and click environment ODDs (Operational Data Definition). ODD is a pointer to the data to extract, where it resides, and what columns to import.

Another method for extraction is Structured Query Language (SQL). The SAS System supports standard ANSI SQL. When the SAS System's internal SQL is unable to optimize queries for the DBMS, the user can then pass native SQL statements to the DBMS. This method is also supported in the Warehouse Administrator for single point of control.

DATA TRANSFORMATIONS

Since the data for the performance warehouse is coming in a variety of elements, data needs to be cleansed for consistencies and data validation. The two steps in transformation are conversion and summarization.

Conversion is aimed at resolving data inconsistencies in value definitions and formats among data. It is an opportunity also to check for missing data and determine whether to take out the missing data or set it to a certain value. Also, at this point in the process, new columns can be derived from the data or calculations. For example, if extracting data from a customer satisfaction survey, how would you take an "Agree" answer and turn it into a numeric

value. In addition, the calculation has to define whether or not the survey meets objectives of the goal. Resolving data inconsistencies can be as simple as a state defined as "New Jersey" in one source and in another source defined as "NJ." This part of the process is extremely important when end user is trying to run a report against the data. In order to link the programs, costs, and measures you must have an object code that will allow the data to merge.

Another part of transformation is summarization. Each level of summary reduces detail, improving performance and minimizing storage overhead. Summaries can be at the numeric level as well as groupings.

The whole transformation process is managed easily inside the SAS/Warehouse Administrator with point and click capabilities. SAS/Warehouse Administrator can perform one to one mappings, one to many mappings plus different functions and calculations with minimal coding. Transformation is a critical piece to ensure the data integrity.

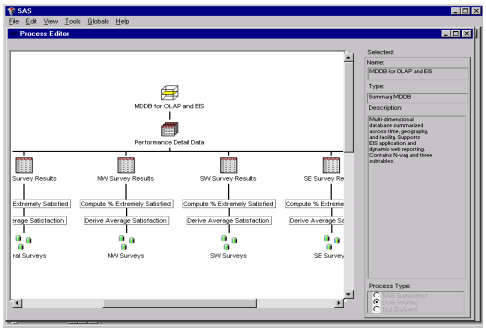
LOADING THE PERFORMANCE WAREHOUSE

Once the transformation has occurred, the performance warehouse can be loaded. The three different approaches in loading the warehouse include the load of data already archived, complete data refresh, and change data capture. One issue with completing data refresh is with the continual reloading of the data warehouse from scratch which will not be feasible because of increasing volumes of data and consuming resources.

To change data capture is to load the warehouse with only the changed data (after the initial load) from the operational systems. The issue here is how to capture the change, which could include options such as scanning internal dates, audit files, journals or logs. A combination of these methods are available depending on the data.

A part of loading the warehouse is scheduling the process. Measure data could be refreshed every week, where as financial information only refreshes monthly. SAS/Warehouse Administrator schedules these processes at a specific chosen time and a chosen interface with different operating system schedulers or with the SAS Domain Scheduler.

Different components can create the performance warehouse. The repository could contain detail tables, summary tables, multidimensional databases (MDDB), information marts (canned queries, graphs, or word documents). Multidimensional databases will be a common theme in most performance warehouses with multiple dimensions: geography, time, programs, lines of business. This cube will allow users to slice and dice on the measurement versus program during a certain period of time. Below is an example of the process editor of SAS/Warehouse Administrator showing the steps to build an MDDB in a performance warehouse.



METADATA FOR PERFORMANCE WAREHOUSE

A crucial piece of the performance warehouse is the metadata, data about data. Metadata is the component that keeps track of the process of defining, creating, and populating the warehouse. Two types of metadata are technical metadata and business metadata. Technical metadata is the physical attributes of the data including input sources, columns, source code and the actual processes.

Examples of technical metadata:

- Sources of operational data
- Targets for warehouse data
- Aggregation methods and rules
- Availability of summarization
- Logical and physical data mapping
- Frequency of downloads
- Exception conditions

Technical metadata assists IT when changes in the warehouse need to occur. Instead of searching through lines of code, IT can perform a search on the metadata and see where in the process the change needs to be performed.

Business metadata contains information for end users to know how to navigate through the warehouse and know on what to report. Business metadata consists of data coverage, business rules, targets, goals, etc. Strategic Plans and Performance Plans should be a part of the business metadata. Thus, when a manager is looking at a crucial measure, the user will know the link to the goal and objective it is associated with. Examples of metadata are:

- Subject oriented content of the data warehouse
- Critical success factors- targets
- Goals
- When the data was refreshed
- Information on how the columns are used
- Dimensions
- Analysis variables
- Summary statistics

The SAS/Warehouse Administrator generates metadata that can be imported from other data sources and exported. Metadata can be exported out to the Web for end users. This will eliminate the black box syndrome where users view data from the warehouse of which they have no knowledge.

THE PERFORMANCE DATA

The exploitation of the warehouse is key to all users. Managers need to quickly and clearly and see performance indicators through critical success factors, reports, and graphs. There are multiple ways to exploit the data warehouse through query and reporting tools, statistical analysis, and applications development. For the performance warehouse, exploitation will be through an Executive Information System (EIS) and a Web Enabled application.

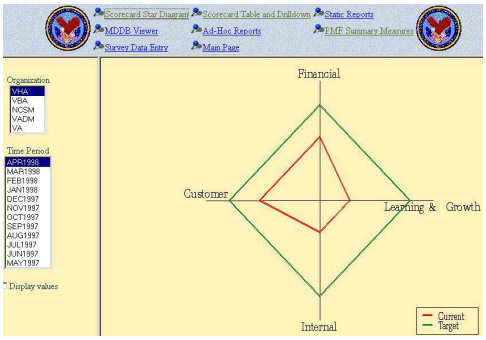
An EIS system provides a user friendly, interactive, out of the box desktop. Managers click on icons and see the relevant information. The data is dynamically driven so users are always viewing the latest information. Features of an EIS include multidimensional viewing, graphs, comparison reports, variance reporting, critical success factors, and forecasting. Multidimensional viewing is referred to as Online Analytical Processing (OLAP) which

enables users to slice and dice the data. OLAP exploits the multidimensional database created in the warehouse to look at different dimensions crossed with analysis variables. OLAP gives the end users the ability to drill through the data at different levels. SAS OLAP tools allow the users to look at the summarized information in the cube, and reach through to the detailed level information that has made up that particular crossing.

PUBLIC SECTOR SCORECARD

SAS Institute combines all the elements needed to track and report on KPIs in the Public Sector Scorecard ©. This balanced scorecard approach has all the data access, data warehouse, OLAP, EIS, Internet and reporting built into one solution.

An easy point and click desktop provides a powerful interface to all your reports, administration and balanced scorecard options, and is customized to allow the most flexibility and ease of use. The Public Sector Scorecard has the built in balanced scorecard intelligence to help you quickly deploy both static and adhoc reporting and a quick snapshot on how balanced your organization is.



Reporting is handled via an EIS or you can disseminate the information via the web. The Web as a thin client, gives users quick access to the information. Dynamic reports could include query and reporting, critical success factors, multidimensional analysis, forecasting, graphing, etc. With dynamic reports, the end user selects certain criteria on the browser, submits, and the information is retrieved from the server and relayed back to the browser. Web applications implement an efficient, scalable solution.

A single version of the truth is accessible through an EIS or Web application without having to wait for an IT request. Exploitation is the finishing piece to the process, the end result. The creation of the performance report(s) should be a part of the EIS/Web application. The user's requirements will predict the finished application.

ROI

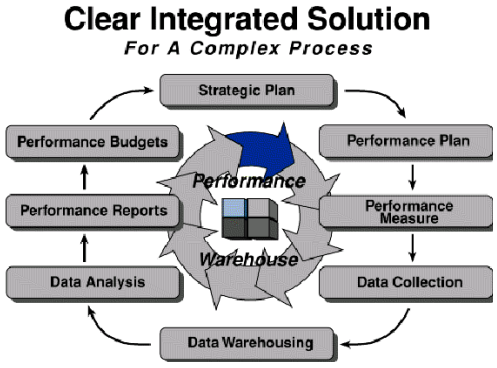
Performance measures, once tuned to give you clear perspective of your organization, will make a big impact. Reduction of costs, more informed decisions and improved customer service. The demand for information and access to it is growing. The web has changed everything and the general public expects more information and faster turn around time. Not only will performance measures and balanced scorecard help you manage your organization at all levels, but will help assist in meeting the growing demand for information delivery.

SUMMARY

The process of building a performance measure warehouse is complex. The methodology proposed is a step by step approach. Often times, agencies try to start at the enterprise level and failure is inevitable. To start building a Performance Management Warehouse, organizations must choose a goal, objectives, and measures with two different sources, and build an application. The next logical succession will be to put the application out to the users, and achieve success. By taking an iterative approach, organizations will then add new goals, measures, and sources of data.

Four Key Steps:

1. Build it
2. Test it
3. Try it
4. Adjust it



A Performance Management Information System should be a clear integrated, scalable solution for managers to make critical decisions before turning in their performance reports. Whether your view of a balance scorecard for your organization is at 30,000 feet or you are at ground zero, resist death by details. Access, Organize, Manage and exploit your data with an integrated approach that helps everyone in your organization maintain better reporting and accountability.

ACKNOWLEDGEMENTS

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